"A Growth study of sports children's"

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Introduction

The general nature of physical development is determined by heredity and different modification and in it by the environment in which a child happens to be. Physical development goes on so automatically that we hardly pay any particular attention to it. Unless there is something abnormal or sub normal about it. We seldom realise that one third of our life is spent in physical development. During last sixty years many research have been conducted in the area of physical development and its theories. Researchers have brought into light many new things. Without a correct knowledge of these new things, parents and teacher cannot succeed in guiding the children properly. But this chapter is not mean to acquaint the reader with the results of these researches, rather we intent to throw some light on the importance of physical development with regard to mental development with regard to mental development and the development of personality.

From the very moment of conception. Goeson continuously. Rise of new traits and transformation of old characteristics. Growth starts from the very moment of conception in the mother's womb and continues till the individual reaches his fullness but after adult the growth turns into a changing process that leads to decline of our power and capacities. Growth goes on continuously, whether we are conscious of it or not. During the early period of the life the pace of growth is fast and we are able to perceive it more easily than during later years. A person feels happy at his growth during childhood, adolescence and adulthood. But afterwards there is a change in his outlook and he considers growth as a change and decline in his power and feels unhappy that he is advancing towards old age.

In method order to determine a norm or standard from the point of view of development for different age groups, a study is made of a big group of person of different ages. This method is horizontal or cross sectional method. In order to obtain a norm this method is more valid. Many persons of a particular age are studied in this method. In order that the difference of various person may have the least effect on its inference.

The Speed of Growth cells is not always the same. At times its slow in mother womb,the growth og germ cell is very fast. within 280 days or so a tiny germ cell assumes a big form of a baby of about 50cm.in size and weight. From the moment of conception to the birth, the increase in weight is about 10 crore times. But from birth the to the age of maturity the proportion of growth in weight is only about 24 times. At the time of birth size of the infant is about one third of what he will attain at the age of sixteen years or so.

When the child is born, there is an immediate change in his environment, as he now confronts as external environment in direct contrast to the environment of the mother's womb. As a result, for the first few days, the speed of growth is obstructed, because the infant naturally wants some time for adjustment in his new environment. it is generally seen that for the first three years the speed so all sided growth is very fast both from physical and mental points of view. The speed between 3 to 6 years of age in also quite fast, but it's not fast as during the first three years. From the second year onwards to the 13 years of age the speed of growth is not always regular. Sometime the speed is slower darning adolescence. From 13 years of age t0 19 or 20 year of age, the speed gets gradually slower and slower.

Growth- Development & Physical Activity

Following birth children grow and develop according to similar pattern until maturity. The Child's growth & development includes an inter-relation expression of physical, cognitive, social, psychological and motor aspect. Growth is a process by which the child's body attains the mature, adult stage. Development refers to an increase with age in capacities, skill and complexity of function. Maturation refers to the development of body size, structure, function and capacities via an in herent genetic program. Boys running, jumping and throwing performances increase through age 18 years which is associated with continuous growth in height & bodyweight and an increase in the proportion of lean weight to body weight. Vigorous physical activity does not affect long bone growth but does increase bone diameter and density. Vigorous physical activity during childhood and adolescent has no effect on height and relatively little impact on body weight, as increased mass is often effectively balanced by reduced body fat.

During the whole development period between infancy and maturity many demands are made on the growing child by its environment. Although it may consider that much of the child's response to new situations is genetically programmed, its continuing growth and ability to survive depends on a resilient and adaptable physically working to sustain an ever

greater mobility. This mobility is gradually attained by the extension and growth of the various organs and segments of the body. The growth rates of these organs and segments are not parallel but move different speeds from each other. A growing child exhibits a gradual change in appearance and shape. Bodyweight shows a steady increase until about the sixth of seven years of life when it is less than 50% of adult value. From seven to eleven years it almost marks time and so increases very little. From about eleven years onwards body weight again shows a regular increase until maturity. This increase is represented by a steady gain in standing height or stature; which in the first place is the result of the increase of leg growth although arm maturity precedes leg maturity. The variation of the speed of growth between one body part and another is regulated so that each part reaches its size, proportional to the role it has to play in the body's physiology at the correct time. Tanner (1955) opined when studying physical development, meet some difficulties. With young children often the short ones grow more slowly; yet in adolescence the taller ones grow more slowly, and the shorter ones grow rapidly for a longer period of time. These types of changes in growth rates tend to accentuate the great variability of children's body measurement.

Statement of the Problem

The study enables to find out the relationship between Physical Fitness and Anthropometric variables among the different age groups of sports children's. The investigation is concerned with the Comparative Study on ***"Age related Changes on growth of 12-16 years boys"***

Purpose the study

1) To observe the growth characteristics of 12-16 years old girls boys.

2) To observe the Physical and Anthropometric status of the sports children's at age group.

3) To analysis and compare the age wise Growth differences, if any the selected Physical and Anthropometric variables among the 12,13,14,15 and 16 years old girls and boys.

4) To study the relationship between selected Growth variables of said age group of girl's boys.

Significance of the study

This study was made to find out development characteristics at the specific stage of growth in the cross sectional approach children of various stage of growth are selected and they are observer in group the same time. On the basis of obtained data an average nature of growth at a specific stage is estimated. The average of each stage is accepted as the norm for that stage. The extensiveness of at each development stage is found out. Thus the form of development at each stage of growth will be accepted as the norm for each child of that particular**.**

In sports fraternity, records and scores may not be there for long. They are usually being broken constantly. This now appears to be axiomatic that records of performance and human endurance will go on registering new heights in the days to come. The present study may be significant in the following ways:

1. The study may help to set up the target of physical variables to be achieved, keeping in view the physical variables demand in different age group categories.

2. The study may help to identify the Physical related changes in various age group categories and its physical adaptation.

3. The Physical and Anthropometric variables selected for this study, from various age groups, can be a frame of reference, for assessing the implication of training and its effectiveness, keeping in view, the growth and developmental aspects underneath various age group categories

4. The rate of Physical Growth status of 12-16 years sports children's and different age group of girls and boys would be compared.

6. The present study may throw new light on Growth of sports children on the basis
Of physique, anthropometric and fitness variables.

7. The information macy suitably be utilized by physical educators and coaches to match the young performer with the performance specially for the budding athletes.

8. The rate of growth for both boys and girls would be known.

9. The status of Physical Growth of both boys and girls would be compared.

10. The norms prepared for different Physical Growth parameters would be useful for evaluation.

11. From the results it would be possible to prepare the programmer of physical education for primary level children.

12) The results will provide some information that will lead further study and research.

Delimitations

1) Study is delimited to sports person and non Sports person.
2) Further studies are delimited to above district level sports person.
3) Further studies are delimited to Active non-sports person.
4) The investigator need not wait for the next stage development.

5) Further studies are delimited to age group 12 to 16 boys and girls.
6) The age range of the subjects of this study was delimited between 12-16years only, and was further sub-divided in five different age groups, i.e.12,13,14,15 and 16 years
7) The study was confined to selected absolute and relative anthropometric variables such as linear measurement (weight, height, sitting height, height of the lower limb and height of the upper limb); circumferences(Thigh girth, calf girth, chest girth, Biceps girth).
8) The physical growth was measured by a few anthropometric
9) measurements such as standing height, sitting height, leg length,
10) The number of subjects for each class were only 500 for each section of boys and girls chest circumference, hip circumference, shoulder width and body weight; The motor fitness was measured only by speed, agility, endurance, balance, reaction time, flexibility, explosive strength and strength endurance
11) The present study was a cross sectional study

Limitations

1) Food habits, lifestyle of the volleyball players considered as the limitation of the study.
2) Socio Economic status, socio psychological status of subjects considered as the limitation of the study.
3) Research is based on opinion of the volleyball players so study was considers response of subject are true.
4) Ground conditions at testing center were not good.
5) The environmental conditions of the different test days were more or less same. Slight variation in climatic condition of various test days, and the influence and effect of this on motor performance if any, was beyond the control of the researcher
6) The subjects of different age groups could not be selected on the basis of perfect age because lack of authenticity of school records.
7) The dietary consumption, daily habits and other activities of the subjects could not be controlled.
8) Instruments used were also a limiting factor with regard to their precision
9) Financial condition and time were also limiting factors
10) For obtaining data motivation, interest and attitude of the subjects subject were also limiting factors.

11) Instruments used were also a limiting factor with regard to their Precision.

Hypothesis:

1) It was hypothesized that there would be the differences in Physical Fitness and Anthropometric variables among the different age group's sports children.
2) It was hypothesized that there positive relationship between Physical Fitness and Anthropometric variables among the different age groups of sports Children's.
3) There is significance influence of physical fitness variables on Anthropometric variables between difference age group.
4) There is significance difference in the physical and Anthropometric variables between difference age group.
5) It was some extent related to growth and therefore, it was expected that five groups will be significantly different from each other in their Physical and Anthropometric variables.
6) However, regarding growth related parameters it was hypothesized that there will be significant difference among the subjects of the five age groups.
7) The Physical Growth and status for the different age group of subjects would be different. The general trend would be the higher status for higher classes
8) The status of Physical Growth for boys and girls at primary level would be similar

Definitions of terms.

Physical Growth

Growth refers to progressive increase in size of the body or its parts its included changes in size body composition, physique, specific body system. Physical growth is a complex representing a continues process of interaction between endogenous and Exogenous factors.

Cardiovascular endurance

Is the ability of the heart and lungs to work together to provide the needed oxygen and fuel to the body during sustained workloads. Cardiovascular endurance is the ability to exercise without becoming overly tired because your heart, lungs and blood vessels are healthy. Exercise examples include walking, jogging, cycling, dancing, running and bike riding. Distance swimming is also a good cardiovascular endurance exercise.

Muscular strength

Muscular strength is the amount of force you can put out or the amount of weight you can lift. Muscular endurance is how many times you can move that weight without getting exhausted

Muscular endurance

Ability of the muscles to perform continuous without fatiguing. Muscular endurance is the ability of a muscle or group of muscles to perform repetitive contractions against a force for an extended period of time. The greater your muscular endurance the higher number of repetitions you could complete

Flexibility

Ability of each joint to move through the available range of motion for a specific joint. Flexibility is the ability of a joint or series of joints to move through an unrestricted, pain free range of motion

Explosive Power. : Strength is the ability to overcome external resistance. Muscular strength is highly correlated with high levels of Rate of Force Development, Power, Vertical Jump, Sprint, change of directions and Pap (Post Activation Potentiation). Explosive strength is the ability to exert maximal force in minimal time.

Agility: It is ability to rapidly change body position and direction in precise manner and ability to change direction of the body or parts of the body rapidly.

Balance: Ability to maintain the line of gravity of a body within the base of support with minimal postural away. Sway is the horizontal movement of the center of gravity even when a person is standing still.

Speed: The ability to move all or part of the body as quickly as possible. Rate at which a person can propel his body or parts of his body through space. Rapidly with which a movement or successive movants of same kind may be perfumed

Body composition

This can be measured using Skinfold readings√,

Circumference (Girth) Measures

Circumference at numerous body sites have been measured and evaluated. From a common sense standpoint. We tend to incorporate a person's girth of various body segments in or appraisal of his or her body build obesity is characterized by large abdominal and hip girth relation to chest circumference

The Gulick tape is used widely in research because it has a spring attached to the handle which permits a constant amount of tension that is applied while measuring. A steel or clot tape may be used

Body Diameter Measurement

Calipers and Anthropometry re employed in diameter measurement. For most measurement the anthropometry is used it consists of a metric scale with a fixed blade and a movable blade. An anthropometry can be easily made with a meter stick and some type of blades

Length Measurement

1) Standing Height
2) Sitting Height
3) Arm Span

Skinfold Measurement's

Skinfold measurements required precise calipers that are designed to apply the same tension through their range of motion. Skin fold provide an indication of subcutaneous fat since the testers pinch includes the fat contained between the double thicknesses of skin and exclude the muscles

Review of Literature

Beunen et al. (1992) studied the effects of increased physical activity upon physical growth, maturation and performance of 32 active and 32 non-active Belgian boys followed longitudinally from 13 to 18 years of age. Anthropometric dimensions included lengths, breadths, circumferences and skin folds. Physical fitness test battery included nine health and performance related tests. They showed that there were no significant effects of increased physical activity on growth in somatic dimensions, including skin folds, age at peak height velocity,skeletal maturation and most of the physical fitness components. Results can be generalized to the average population but do not necessarily apply for highly trained and selected elite athletes.

Brengdon (1973) made a comparison of physical fitness and anthropometric measures of pre-adolescent, Mexican American (n=300) and Anglo Americanmales (n=300) between 8 to 11 years of age. The findings revealed significant differences between the Mexican American and Anglo American male in certain physical fitness items and anthropometric measures. The relationship between selected anthropometric measures and various physical fitness items were
significantly higher for the Mexican American males. The result indicated that Anglo American males were superior in performing selected physical fitness items.

Meredith in his study of children in 1934 notice for cycles of development. According to him, the period of the first two years in period in which the growth is very rapid. The growth after second year to the 11^{th} year is slow. From the 11^{th} years to the15th year, the child again develops at a faster rate. After the 15^{th} or 16^{th} year to the 18^{th} year the development (growth)

again becomes slow. As has been said above, there is a great individual difference in the growth cycle.

Methodology

Procedure and technique make the most dominant contribution towards the success and failure of any research work or investigation. It also depicts scientific attitude and validity of the work. So the Procedural method with specific operation directed towards logical conclusions has been planned and performed in this chapter on methods and materials. After establishing hypothesis in relation to the objectives, the next step is to develop the procedural methods in the instructional model. This indicates that Specific operation based on the hypothesis that will accomplish the desired objectives must be planned and performed. Hypothesis based on the best information available should be used to direct the procedure. Methodology is one by which programs are initiated and carried out. This chapter of methods and materials deals with Subject of the study, criterion measures, design of the study, tools and the procedure for data collection and had been described according to set norms. This was a study falling under the category of status in the field of physical education and sports. In this study the investigator made an attempt to evaluate, compare to establish relationship on the selected growth related parameters and motor performance parameters**.**

Subjects of the Study

The subjects of the present study were one hundred and fifty (150) adolescent school going boys aged from 12 to 16 years. Since it is an importa

Methods & Materials

criterion for this study school record regarding age was considered and on the basis of that subjects were selected and assigned to respective age groups.The Socioeconomic condition of the subjects was more or less same but variation in daily routine and culture due to regional peculiarities was evident. The foods habits, habitual, physical and leisure time activity and some other minute details could not be controlled and was beyond the scope of the study. However, there was not much variation in general health which was within the normal range.

Sampling Procedure:

3.4 Criteria Measured

The growth and the motor performance variables of the subjects were considered as criteria measured for the study. Measurements of Growth parameters include ten items and motor performance parameters include six test items.Keeping in view the feasibility, Criteria and the relevancy of the variables to the present Study the growth parameters measurements with their units are presented in Table-1 and motor performance parameters selected for the study along with the test items

TEST DESCRIPTION PHYSICAL FITNESS COMPONENTS

There is a general confusion among such terms as motor fitness, general motor fitness, physical fitness, organic fitness, motor ability, motor capacity etc. Different schools of thought have given varied definitions for all the above mentioned terms. But few of the authors have suggested and made identification of motor ability components and physical fitness components to measure and are considered as essential elements of physical fitness. Accordingly Cureton and Latham (1964) have suggested, "The general motor ability as strength, power, muscular endurance, flexibility, agility and balance. And seventh component, cardio- vascular endurance (fitness) were not included in the above analysis but consider as a special element of complete fitness of specific physical fitness in cardiovascular endurance." So keeping in view the above, investigator has selected the following test items on the basis of literature given in 'Bosco and Gustafson' book "Measurements and Evaluation in Physical Education, Fitness and Sports" under the heading of specific physical fitness i.e. strength, power, muscular endurance, flexibility, speed and agility. Much work had been done in the area of physical fitness, but it is difficult to develop a single test item that adequately ensures all aspects of physical fitness.

The most important factors of physical fitness are: Speed, Strength, Endurance,Power, Agility and Flexibility

Sl No	Physical Fitness	Test Items
01	Cardiovascular	Bleep Test
02	Muscular Strength	Sit ups
03	Muscular Endurance	Sit ups (Boys) Flex Arm Hang (girls)
04	Flexibility	Bridge of test
05	Explosive power	Standing Broad Jump
06	Agility	Shuttle Rub
07	Balance	Bass stick Stand
08	Speed	30 mtrs

List of equipment's used

The equipments used during the test:

i) Weighing machine (Portable)
ii) Flexible tape Methods & Materials
iii) Electronic stop watches
iv) Anthropometric rod
v) Stadiometer
vi) Sitting height table
vii) Clapper
viii) Wooden blocks
ix) Whistle

Procedure for administering tests

The following tests/measurements were administered:

a) Measurement of personal data
b) Measurement of Growth Parameters

Cardiovascular

1) **Beep test:**
   Purpose: To measure the cardio vascular fitness level and maximum oxygen uptake
   Equipment: Flat, non slip surface, marking cones,20 m measure tape, beep test audio, audio player, recording sheet
   Description and Administration: The participants stand behind one of the lines facing the second line, and begin running when instructed by the recording. The speed at the start is quite slow.
   Instructions: The subject continues running between the two lines, turning when signaled by the recorded beeps. After about one minute, a sound indicates an increase

in speed, and the beeps will be closer together. This continues each minute (level). If the line is reached before the beep sounds, the subject must wait until the beep sounds before continuing. If the line is not reached before the beep sounds, the subject is given a warning and must continue to run to the line, then turn and try to catch up with the pace within two more 'beeps'. The subject is given a warning the first time they fail to reach the line (within 2 meters), and eliminated after the second warning.
Scoring: The athlete's score is the level and number of shuttles (20m) reached before they were unable to keep up with the recording. Record the last level completed (not necessarily the level stopped at)

Muscular strength

2) **SIT-UPS** (BENT-KNEE) though many variations to conduct this test appear in the literature of physical fitness, but the investigator used the description given in the "AAHPERD Youth Fitness test" (1980).
Purpose: To measure strength.
Equipment: A mat, stopwatch.
Description and Administration: The subject lied on the back with knees bent, feet on the floor, and heels between 10-12 inches (25.40 cm. - 30.48 cm) from the buttocks. The fingers were clasped behind the neck and the elbows placed flat on the - 81 - floor. A partner held the feet in the place. The abdominal muscles were tightened; head and elbows brought forward and touched to the knees. The subject returned to the starting position and repeated the exercise.
Instructions: Fingers must remain interlocked and in contact with the back of neck at all times and head and the elbows must be brought forward and touched to the knees.
Scoring: The number of correctly completed sit-ups in 60 seconds was recorded. One fair trial was allowed.

Muscular Endurance

3) **Sit ups:**
Purpose: To measure the endurance of Abdominal Muscles
Equipment: Mat and yardstick
Description and Administration: From lying position on the back the performer flex his knee over the yardstick while sliding his heels as close to his sat as possible.The yardstick should be held tightly under the knee until the performer is instructed to

slowly slide his feet forward. At the point where the yardstick drops to the mat.The tester marks the heel line and seat line to indicate how far the knee sit up exercises.

Instructions: The performer should interlace the fingers behind the neck and perform sit ups alternating a left elbow touch of the inside right knee. The exercises should be repeated as many times s possible

Scoring: The total number of repetitions is recorded for the score. However repetitions should not be contact behind the head, when fingertip to not maintain contact behind the head, when the knee are not touched or when the pupil pushes off the floor with the elbow.

4) **Flex Arm hang**

Purpose: To measure the endurance of the arm and shoulder girdle.

Equipment: A horizontal bar, Stop watch

Description and Administration: With an overhand grasp and the assistance of two spotters the perfoermer should raise the body off the floor so that the chin is above the bars and the elbow are flexed.

Instructions: The performer should hold this position for as long as possible

Scoring: The number of seconds to the nearest second that the performer maintains the proper position is recorded as score

5) **Bridge up Test**

Purpose: To Measure the Hyperextension of the spine

Equipment: Flex measure case with yardstick and ruler guide inserted

Description and Administration: Assume a supine(back Lying) position on the floor (a mat) and tilt your head back as you push upward, arching your back while walking the hands and feet as close together as possible.

Instructions: Flex measure located at one side places the zero end of the yard stick on the mat or floor and slides the flex measure case vertically upwards until the ruler guide touches the highest point of your arched spine

Scoring: The best score of three trials is recorded and then subtracted from your standing height

6) **Standing Broad jump**

Purpose: To measure the power of the legs in jumping forward.

Equipment: Floor may be used for this test. Marking material is needed for the starting line, along with a tape measure to mark off increments of distance along the landing area

Instructions: with the feet parallel to each other and behind the knee and swings the arms and jumps as far forward as possible

Scoring:the number of inches between the strating line and the m-nearest heel upon landing is the score. Three trials are permitted and then the best trials is recorded as the score

7) **Shuttle Run**

Purpose: To measure agility.

Equipment: Two lines parallel to each other were placed on the floor 30 feet apart. Since the player must over run both of these lines, it was necessary to have several feet more on floor space at either end. Two blocks of wood, 2 by 2 by 4 inches and a stopwatch were needed.

Description and Administration:

The player stood at one of the lines with the two blocks at another line. On the signal to start, the player ran to the blocks, took one and returned to the starting line and placed the block behind that line. She then returned to the second block, which she carried across the starting line on her way back. Two players ran at the same time. Two trials were permitted. The players were given the option either to run barefooted or wear sneakers of their choice.

Instructions: On the signal "Go" the player were asked to run as fast as she could to the next line and pick up a block and she was also asked to return the blocks over the 2nd line floor and not throw the blocks while returning for the second block. She was asked to finish (run across) the starting line as fast as she could without placing the block on the floor. **Scoring:**

The score was the elapsed time recorded in seconds and tenth of a second of the best of two trials. Testing Personnel: One time keeper, recorder and one helper to collect the blocks.

8) **Bass stick test:**

Purpose: To measure the static balance of the foot balance

Equipment: Several sticks 11 inch wide and height 12 inch long,stp watch

Description and Administration: Arrange several performer in one line and observer for each performer should place the ball of the foot crosswise on the stick and lift the opposite foot crosswise on the stick and lift the opposite foot the floor holding the balance for as long as possible up to a maximum of 60 seconds.

Instructions: As the timer counts should observer takes note of how long his performer maintains balance. Have each performer execute the test six time.

Scoring: The score for the test is sum of the times for all six trials.

9) **30 mts dash**

Purpose: To measure speed ability
Equipment: Measuring tape, stopwatch, cone,
Description and Administration: A through warm up should given including some practice position, with one foot must be on or behind the starting line. This starting position should held for 2 seconds prior to starting and no rocking movement are allowed.

Instructions: The tester should provide hints for maximizing speed and encourage them to continue running hard through the finish line

Scoring: Two trials are allowed, and the best time is recorded to the nearest 2 decimal places.

Anthropometric Measurements:

Circumference:

1) **Thigh Circumference**:

It was measured just below the gluteal fold or maximal thigh girth. Subject was asked to stand in a relaxed position with feet slightly apart and weight equally distributed on both the feet. Steel tape was located horizontally around the left thigh at a point of greatest girth. Reading was made to nearest 1/10 of a centimeter.

2) **Biceps Girth:**
   Greatest girth when the arm is maximally flex and muscles fully contracted. Greatest girth when arm is fully extended and muscles

Body Diameters

3) **Biacromial Diameter:**
   The most lateral margins of the acromial processes with shoulders relaxed aand elbows close to the body. Measured from behind the subject

4) **Bi-lliac Diameter:**
   Greatest width of the pelvic girdle at the lateral margins of the iliac crests taken from in front of the subject.

5) **Knee Diameter:**

   With knee flexed 90 degree the widest margins between the lateral and medial epicondyles of the femur.a

With the individual seated on a table and the knee bent at right angle, greatest distance between the lateral and medial epicondyles of the femur was measured with the help of vernier caliper with slight pressure of the cross

Length

1) **Standing Height**
2) **Sitting Height**

   Purpose: To measure the length of the sitting height.

   Equipment: Sitting height table, anthropometric rod.

   The subjects were on a sitting height table/bench keeping the back with the wall, sat as correct as possible with legs hanging down and the arms resting on the things. Distance was measured from the bench to the vertex (highest point on the top of the head) by keeping a horizontal scale placed on the head perpendicularly to the wall.

   Subject is on a bench or table sitting are erect as possible with legs hanging down and arm resting on thighs.Distance measured from bench to vertex of table top**.**
3) **Arm Span**

   Arm Length: It is the distance between acromion point and dectylion point. The subject was asked to stand in a comfortable position. One end of the anthropometer was fixed at acromion point and the anthropometry was adjusted uptodectylion point. The reading was recorded up to nearest 1/10 of a centimetre

   With back against wall arms are extended horizontally.Distance taken from out stretched fingertips of one hand to the other.

Skin fold Measurement

10) Sub-scapular Skin fold:

The skin fold is taken at the tip of the scapula(inferior angle) with the subject in a relxed standing position .The fold is lifted in the diagonal aplne at about 45 degree from the vertical and horizontal planes.

It is a measurement of the skin fold running parallel to the axillary border. The measurement was taken at the inferior angle of the scapula. The thickness of this fold was measured with the help of skin fold caliper

11) Triceps Skin fold:

The skinfold is taken over the triceps muscle at a point half way between the tip of the shoulder (Acromial process) and tip of the elbow(alecranon process) .the pointis located with forearm flexed to 90degree in making measurement, however the arm should hang free. The fold is lifted parallel to the long axis of the arm

This measurement was taken on the posterior surface of the arm at the level of biceps skin fold with the subject in the same position.

12) Abdomen

The skinfold is taken on the side of the abdomen at the maxillary line at the level of the umbilicus. The fold is lifted parallel to the long axis of the body

13) Medial Calf

Calf Skin fold: The vertical fold was picked up on the posterior side of the lower leg at the level of the maximum girth of the calf and measurements were recorded.

Design of the study

In the present study since the two criteria were measured the related tests were conducted for two aspects separately. The tests and measurements were conducted on two consecutive days for a particular age group. On a specific data the researcher and his team arrived in the morning and on the first day growth parameters were taken on the 12 years age groups boys and on the second day the motor performance tests for measuring motor performance ability status were conducted. Simultaneously, all growth and motor performance test parameters were taken for all age groups boys.

For collecting data the researcher had taken assistance from other research scholars and post graduate students of the department of physical education. University of Kalyani and also physical education teachers of different schools of Naihati, 24 Pgs.(N). To maintain the uniformity in conducting the tests and the adaptation of test procedures, all those who assisted the researcher, were given proper and scientific instructions to orient themselves well in advance. Through tests- retest tester’s competency and reliability of data were established. Appropriate care was taken to avoid variation in environmental condition, temperature, gadgets uses etc. Since a wide distance had to cover for data collection. For maintaining uniform environmental condition tests and measurements were conducted only in two months of a year, February and March. In the state of West Bengal during these months variation in temperature and humidity is minimum. The tests were conducted in the school play ground of Naihati Narendra Vidyaniketan, Naihati, 24 parganas(N)

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